

The U.S. Army's need for the V-22 and the Quad Tilt Rotor

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The U.S. Army's need for the V-22 and the Quad Tilt Rotor

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"The use of heavy lift rotorcraft to vertically envelop the adversary with the future combat system force package has shown significant promise in war games and simulation models."<sup>1</sup> However, the U.S. Army currently lacks a heavy lift rotorcraft that is capable of transporting assets throughout the depth of the battlefield. "The objective of the Deep Battle Concept is to limit freedom of action of the enemy commander and to disrupt the coherence and tempo of his operations."<sup>2</sup> The Army's current aviation assets can not support the deep battle concept and must be augmented by the V-22 in order to remain dominant in future conflicts. In order for the Army to maintain its force projection capability and continue on its envisioned goals of Future Combat Systems (FCS) and sea-basing it needs to acquire the V-22 and research a quad-tilt version of the V-22. The V-22's operational capabilities will enhance the Army's operational readiness and relevance and expand the research for the quad-tilt rotor continuing to press the envelope of the Army's transformation process.

#### The Army's Inability to Support the Deep Battle Concept

The concept of Future Combat Systems is the capability to rapidly project a dominant ground force anywhere in the world within days. "Mounted Vertical Maneuver" is the phrase for operations that require FCS-bearing aircraft to

lift off from sea bases and fly deep into enemy territory, where they will disgorge their vehicles to unhinge, dislocate and disintegrate enemy forces.<sup>3</sup> Both ideas of FCS and mounted vertical maneuver are critical to the execution of the deep battle concept which can not be achieved using the Army's current heavy-lift helicopters, the CH-47D, E and F. The CH-47D, E, and F provide limited or no capability to perform many of the deep battle concept missions that the V-22 is executing and that the QTR is being conceptually engineered to accomplish. Some of the deficiencies in the current Army inventory of CH-47s include an inadequate payload, range, and airspeed; lack of ability to communicate, navigate, and operate in adverse weather conditions, day or night; lack of self-deployment or aerial refueling capability; inability to operate in a nuclear, biological, or chemical environment; insufficient threat detection and self-protection; high maintenance and inspection rates; and limited communication capability for embarked troop commanders.<sup>4</sup> All of the listed deficiencies weigh heavily into Army planners' decision making process when determining what objective is realistic or not.

The V-22's ability to execute the Deep Battle Concept

Characteristics and Capabilities of the V-22

Fortunately an aviation platform already exists that begins to solve the deficiencies currently limiting the CH-47. The obvious solution to the problem is the procurement of the V-22 Osprey, a multi-engine, dual-piloted, self-deployable, medium lift, vertical takeoff and landing (VTOL) tilt rotor aircraft designed for combat, combat support, combat service support, and Special Operations missions worldwide.<sup>5</sup> The V-22 capabilities offer a VTOL cargo capacity of 20,500 lbs, a range of 200nm pre-assault raid with eighteen troops with an additional capability of aerial refueling, a cruise speed of 240 knots (V-22), and advanced communication and navigation systems. The CH-47E's one hundred knots cruise speed while carrying a payload of 28,000 lbs and limited range of 150nm is extremely restrictive for planners. By adding the V-22 to the Army's inventory, commanders will gain the ability to plan and execute the deep battle concept.

#### The Operational Need for the Army to acquire the V-22

Pilots currently obligated to operate the military's fleet of obsolescing helicopters already appreciate that the V-22 will represent a quantum improvement in their ability to perform their missions effectively and safely. The next closest heavy lift assets belong to the U.S. Air Force's air cargo fleet but they are not a part of the idea

behind the mounted vertical maneuver concept because they require excessive amounts of runway. Not only is there a definite future requirement for the V-22, there is an immediate requirement in the Army's on-going missions in Iraq, Afghanistan and the global war on terrorism. As the Army attempts to project forces globally it must have a platform that can enhance its conventional forces. The high military stakes involved in such missions make it imperative that they be carried out successfully when undertaken. The Army's need for a vehicle capable to deploy rapidly over long distances and engage in surprise operations by virtue of the flexibility inherent in an extended range operating range and the ability to carry out missions in a single period of darkness is essential. These capabilities were referred to directly in the Congressional review of the V-22 program,

In the evolving global geopolitical circumstances wherein confrontations among major powers seem somewhat less likely and engagements involving small groups ranging from terrorists to mid-sized nations seem more probable, the type of capability identified for the V-22 would seem to be important.<sup>6</sup>

Aviation Transformation and Cost-Savings

In addition to the operational need, the cost savings of the V-22 falls in line with the Army aviation transformation process and the cancellation of the \$88 billion RAH-66 Comanche project. The Army has redirected its focus on medium and heavy lift rotorcraft. The logical next step in the Army aviation transformation process is the acquisition of the V-22 Osprey and research of the quad tilt rotor. Since the other option to the V-22 is the existing aging fleet of helicopters that will eventually need replacement or significant upgrades. Most of the current generation of aircraft have completed their production lifecycle and would be costly to reintroduce into production. The Marine Corps is currently going through similar aviation realignment:

The V-22's critics still hope to persuade the Pentagon leadership that the costs of acquiring hundreds of these planes will be unaffordable. The fact is that replacing the Marines and Special Operations Forces' aging helicopters with Ospreys will be expensive. Unless, however, these units are going to be put out of business -- a singularly unlikely prospect given their extraordinary performance and increasing importance in the war on terrorism -- a huge

investment is going to have to be made, one way or another, in modernizing their aviation assets.<sup>7</sup>

The cost-effectiveness mentioned above has consistently found a marginal additional expense associated with the tilt rotor technology is more than offset by improved survivability, performance, reliability and streamlined logistics.

The Army has only just recently begun to realize that in order for FCS to exist it must spend time and research money in the concept of the quad tilt rotor. Because, "The ultimate goal is to produce a vehicle by 2025 that is able to lift 26 tons and able to fly 500 nautical miles, thereby out hauling the C-130 and CH-53."<sup>8</sup> Expanding time and money in research is essential to the development of the QTR. This explains why, "The Army awarded Sept 15, 2005, a \$3.45 million contract to the team of Bell Helicopter and the Boeing Company to perform conceptual design and analysis of its Quad Tilt-Rotor (QTR) aircraft for the Joint Heavy Lift Program. Bell Boeing's QTR is an application of its tilt rotor technology used in the V-22 Osprey."<sup>9</sup>

### Counterarguments



Obviously there are inherent risks in any aviation mission, but with proper countermeasures those risks can be mitigated. For example the V-22 and computer simulation models of the QTR, experience rapid rates of descent and uncommanded roll during the transition from horizontal flight to vertical flight. That has caused several catastrophic accidents during the testing and fielding of the aircraft. Ultimately the Congressional Review of the V-22 program in 1991 determined that production should continue at a lower rate allowing the "development of mitigating strategies to limit the potential for autorotation and the risk (probability and severity) of asymmetric thrust conditions."<sup>10</sup> The Marine Corps responded in 1991, by developing the strategies that Congress requested and has completed the tactical testing of its first squadron with few to no significant accidents.

Another hurdle that the Army will face in the acquisition of the V-22 and QTR will be the retraining of all levels of officer, NCO and enlisted soldiers. The majority of Army pilots have only been trained in rotary-wing operations. Three to four months of fixed-wing training would be required with at least another two months to complete the V-22 transition. This would also increase the risk of aviation accidents because the majority of

crews would be low time fixed-wing pilots with little to no time in a V-22. Additionally, the mechanics tasked with working on the planes will initially have little to no experience working on the V-22. An effective transition plan that would incorporate several weeks of training would have to be in place in order to mitigate this risk.

### Conclusion

Overall, there is a definite need in the Army for augmentation by the V-22 and the future QTR platform in order for the deep battle concept to be realized. Unfortunately, the Army can not currently support the deep battle concept with its existing CH-47s. However, the deep battle concept could be easily realized with the procurement of the V-22 and further expanded with additional research in the QTR. The V-22 has shown unique potential to meet the Army's needs. With the Aviation Transformation and cost savings involved in the purchase the Army is at a unique crossroad in which it can greatly expand its operational ability to win the nation's wars or simply chose to remain static. These acquisitions and research projects are absolutely necessary for the Army's current needs and, more importantly, in order for Army aviation to remain relevant into the future.

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<sup>1</sup> Grossman, Sollfrey, Rubenson, Steele, "Vertical Envelopment and the Future Transport Rotorcraft" 2003, page xi

<sup>2</sup> Army Publication; FM-100-5 pages 6-14 to 6-15, and 7-13

<sup>3</sup> Marine Times Dec. 5, 2005 page 36

<sup>4</sup> Review of the V-22 program, page 8

<sup>5</sup> [www.centerforsecurity.policy.org](http://www.centerforsecurity.policy.org)

<sup>6</sup> Review of the V-22 program, page 5

<sup>7</sup> [www.centerforsecurity.policy.org](http://www.centerforsecurity.policy.org)

<sup>8</sup> Marine Times, Dec. 5, 2005, page 36

<sup>9</sup> AAAA Magazine, Oct. 31, 2005, page 54

<sup>10</sup> Review of the V-22 program, page ix

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